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Usability Diverges, Media Converges, Design Remerges

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I gave my fourth World Usability Day (WUD) talk a few months ago in Estonia (the talk may have been WUD 2019's largest event). The WUD 2019 theme was "Design for the Future We Want." That would have worked well for a design conference, which could also have focused on communicating "the value of design" and educating "the entire organization on good design and what it takes to get there." However, these two quotes are not from a design source, but from the overview for a UIE workshop: "Lead your organization to deliver better-designed products and services through a custom UX strategy." To further illustrate how the usability field is diverging beyond UX into design, in the last six months, The Nielsen Norman Group has posted articles and videos on Design Ops, Design Thinking, Paper Prototyping, Customer Experience, Service Design, Service Blueprinting, Scenario Mapping, UX Work in Agile Backlogs, UX Debt, and Tracking (design) Assumptions.

Why is there still a "U" in WUD and JUS? It's like a garden center called *Tulips R Us* with tulips on just one stand in a sea of greenhouses, greengages, green willow, and more. Usability has diverged, renaming itself to UX in many contexts, with an increasing focus on design. It wasn't always like this. Designers and their cool designs have been repeatedly in UX crosshairs.

Media Converged and With That Came Designers Who Have Kept Coming

Before UX diverged to consider design, creative media converged via digital formats. Before multimedia, no specific craft skills were needed to design user interfaces. Human factors specialists could readily draw out an 80 x 24-character VDU layouts and flow charts. With multimedia, sound and images could be incorporated into interactive software. This called for creatives from audio, graphic, and moving image design. Games and desktop multimedia called for them first, then the web and most recently apps, where it is now too risky to not involve visual designers.

In 2017, TechCrunch reported on six major tech companies who had doubled their design hiring goals since 2012. Their ratios of designers to developers had risen rapidly, for example: IBM from 1:72 to 1:8, Atlassian from 1:25 to 1:9, and Dropbox from 1:10 to 1:6. The first ratio for these is a good indicator of a company's age: Intercom started in 2015 with a ratio of 1:5. However, the second higher ratio can hide internal variation, since IBM's mobile team ratio was 1:3 (Field, 2017).

Having developed additional expertise on design thinking, agile development, service design, and similar techniques, UX folk can still complain about job adverts that stress visuals more than research. Of course, poor usability is a major risk, but ugliness is a bigger one for free apps that are easily replaced. Ugliness is immediately apparent. Usability isn't and, unlike ugliness, can improve with use (Tractinsky, Katz, & Ikar, 2000). Despite adding design expertise to their repertoire, many UX specialists don't really understand creative design. I hope that this essay can begin to change this.

Understanding Creative Design and Designers (and Applied Science too)

After 26 years in academic computing (interspersed with work in, with, and for industry), I became Professor of Design Theory at Northumbria University, the successor institution to Newcastle Polytechnic that inherited its Design School and outstanding alumni such as Jony Ive and Tim Brown. I had added design research content and some studio practices into my computing teaching at Glasgow and Sunderland universities, so teaching studio-based Interaction Design was not new to me. After 10.5 years at Northumbria, I retired, but currently work one day each week in Computing at Sunderland again.

If you recruit UK studio-trained designers, you can expect them to have been carrying out a wide range of research since high school. This research rarely uses rigorous (human) science approaches. However, harsh positivism apart, truth is not black or white. Also, the project value of research lies in its pertinence, not in its rigor. Human-centred design has long been dogged by user research lacking implications for design (Dourish, 2006) and other forms of downstream utility (Law, 2006). Rigor does not guarantee utility. Research flaws do not infect designs. After all, if scientific study designs are perfect, why are discussion sections in psychology papers a locus for plea bargaining?

Northumbria Interaction Design graduates are in very high demand. Most have very strong visual skills on entry, which get better. Most have good basic research skills, which are required from 14 years old onwards for high school creative disciplines. These are mostly desk research skills (updated for the internet age), although with UK specialization (1–5 subjects in 11th and 12th grades), some have studied psychology, and others math and science. Their research skills improve during their degree program, especially contextual research and user experience evaluation. Some become pure user research specialists a few years after graduation. However, their previous holistic design experience helps them with implications for design (they can explore designs alongside their user research). They can feed UX concerns into evaluations and anticipate design responses.

Given the broad integrated expertise of studio-educated Interaction Design graduates, the wounded plea of pure UX researchers ousted by "mere" visual designers that "UX is not UI" is misinformed. It is misinformed in the present because it assumes that designers lack adequate research skills in contextual research and usage evaluation. It is misinformed in the past because over 30 years ago, industrial colleagues were clear that "user interfaces" extended beyond user input and screens to the whole "user experience," a term already established in the

1980s (Cockton, 2008). Adopting a service design perspective before this name existed, colleagues (including the creator of SUS) would extend the UI beyond perception and motor skills to dialogue, conceptual models, response times and also technical reliability, documentation, and help desks. UX is only *not* UI when UI is not UX. In the 1980s, they were synonymous with customer experience (CX) too, covered with touch points such as help desks.

For the past two decades, UX has become more emotionally rich, but established design disciplines have mastered emotion and meaning for millennia. UX is playing catch up. There is still a clear blue ocean between the baby steps of emotional and semantic UX and (much) longer established design disciplines such as fashion, interiors, and automotive. The Eames' and Saarinen's pavilion for IBM at the 1964–1965 New York World's Fair was a UX masterpiece.

Usability has diverged into UX, but UX has still not diverged enough to be an equal partner with digitally converged design disciplines, which are not properly understood in UX. The following are key misunderstandings that I've experienced with UX practitioners who

- confuse creative studio practices with commoditized design thinking,
- see Agile development as the last word when it is a timid increment,
- place excessive faith in rational systematic processes, and
- devalue lean and pragmatic orientations to design work.

"Design Thinking" Is Not Creative Design Practice

Design Thinking is steadily transferring simplified, pruned creative design practices to managerial, bureaucratic, or scientific domains. Ironically, currently dominant commoditized forms of Design Thinking use rationalist frameworks and vocabularies that cannot transfer the full range of creative studio practices (Kolko, 2018).

UX professionals who embrace packaged Design Thinking constrain their divergence within rational idealized linear engineering design (Parnas & Clements, 1986), where UX is a "problem-solving approach focused on people" (Gribbons, 2017, p. 3). Problem-solving is the language of engineering design, where solutions are developed for well-specified problems. International Organization for Standardization 9241-210 (ISO, 2019) is a rational engineering design process, albeit one much simpler and less well thought through than in undergraduate engineering design textbooks (e.g., Dym, Little, & Orwin, 2014).

In contrast, creative design blends problem-finding and problem-setting (Schön, 1983), focusing on different memoranda at different times. Memoranda are things to be borne in mind. Human factors are not the only memoranda, but ISO 9241-210 (ISO, 2019) supports separate managerial planning of HCD with little basis for interfacing with other design and development activities. There is only one actual process for a project, and it is a mistake to think that different arenas of specialist practice should be siloed from the outset.

There is over a half-century of evidence now that rational analysis-synthesis-evaluation models, which most Design Thinking perpetuates, are wrong. When rational linear design methods were first proposed in the 1960s, creative disciplines countered with a conjecture-analysis model (Hillier, Musgrove, & O'Sullivan, 1972) where analysis of design-led conjectures draws on a range of memoranda, some user-centred. In such models, problems and solutions co-evolve. Creative design does not follow the tidy boxes and arrows of linear problem-solving approaches. This is consistently evidenced and replicated in four decades of empirical studies of design work, sometimes clumsily summarized as "creative design is messy." Close up, creative design work is not messy. There are clear logics behind design moves (Goldschmidt, 2014). Not fitting bad models does not make creative design messy. Unfortunately, it does not make fantasy process models go away.

"Agile" Is Not Creative Design Practice

Progress away from normative rational design processes is frustratingly slow. There are major impediments to creative alternatives, hence the safe play of commoditized Design Thinking. Language is a major impediment, as can be seen in the early account of the realities of "problem-solution co-evolution." Rittel and Webber (1973) contrasted "Wicked Problems" with "tame problems," where linear problem-solving approaches do work. Wicked problems cannot be confidently specified until after acceptance of a solution, and so are not problems, but puzzles. Nor should there be any moralizing: They are "wild" not "wicked." A more accurate name would be "wild puzzles," which is essentially what creative practice briefs are.

Wicked problems originated in planning research. A decade later, a detailed study of lean innovation in Japanese consumer electronics and automotive identified six factors associated with successful design for wicked problems (Takeuchi & Nonaka, 1986). One was *overlapping development phases*, which underpinned *lean and concurrent engineering* in the 1990s, but often with poor outcomes due to excessive focus on time to market at the expense of design quality.

The other five factors were *tolerance of instability*, *subtle management control*, *multi-learning*, *organizational transfer of learning*, and *self-organizing project teams*. Overlapping development phases was introduced by comparing a linear relay with a concurrent Scrum. Takeuchi and Nonaka are cited by a co-inventor of Scrum as a major influence, but Scrum is linear, not concurrent. Iteration isn't enough. A circle is still one line. Concurrent engineering needs several swim-lanes.

Agile software development lags behind concurrent engineering. Scrum only adopted two of Takeuchi and Nonaka's six factors: organizational transfer of learning and self-organizing project teams. The latter was not balanced by subtle management control. The former tends to be limited to the project team in Scrum.

Scrum is crippled by the linear relay that it had hoped to escape, reducing tolerance of instability. Scrum's preference that any team member can perform any task is not multi-learning (Cockton, 2016), which may only require a major and minor specialism, with no expectation to do everything.

Given decades of evidence across engineering, software, product, and other design disciplines that work does not proceed through orderly phases of distinct activities (research, requirements, design, evaluation), why in 2019 was ISO still advocating a linear process model? One possibility is that no alternative has ever been considered. The current 9241-210 process is reassuringly similar to those in engineering design textbooks. It is the sort of process that managers can plan, resource, schedule, and track, and thus control, but only for tame problems.

Rational processes are not preferred for their truth. It would be a miracle if the path to a creative unknown could be meticulously planned with full foreknowledge of every step and resource need, but managers find it difficult to make space for creative work and relax on upfront planning. Much creative practice is *directed*, not managed. Creative and art directors steer (*subtle management control*), not manage, to rigid initial plans.

Following Fixed Processes Is Not Creative Design Practice

Rational action has been associated with prior plans since at least Aristotle, who argued that the deliberation for plans had to be correct with regard to what should be achieved, how it should be done, and when (Pires de Oliveira, 2017, p. 22). Plans also lie at the heart of the scientific method, where an excellent study design can be implemented with guaranteed results, not as the guaranteed practical outcomes that Aristotle wanted, but as proof or not of a theoretical hypothesis. Whatever the result, it will be true if the study design, its implementation, and the data analysis are adequate. This is the basis of the rigor in UX research that Barnum (2019) has recently celebrated. The underlying epistemology is logical positivism, where truth rests on rational argument and empirical evidence that in turn require public universal rules of argument and adequacy standards for samples or corpora. Neither exist. Quine (1951) exposed shortcomings in the foundations of incontrovertible logical arguments. Popper (1959) challenged

incontrovertible completeness for any corpus of evidence (the Black Swan argument). Popper thus argued that science is not characterized by incontrovertible verification, but by the possibility of falsification. The best scientific theories repeatedly resist attempts to falsify them. None can be verified forever.

Decades of research have confirmed the realities of design practice, which do not match rational models. Decades of scholarship in the history and philosophy of science and of empirical research in science and technology studies has had similar outcomes for the idealized accounts of THE Scientific Method taught uncritically from high school onwards. One would expect scientists to respect objective evidence from past and present, but values matter more. The result is Scientism, which combines a dogmatic refusal to accept the realities of scientific work with insistence that the only valid knowledge results from logical positivism via an imagined scientific method. Pinker (2018) attacked science and technology studies and the humanities for results that he disliked, but engaged with no actual empirical evidence or philosophical arguments. If scientific evidence should not be ignored, can humanities and social science evidence be?

Rational processes are logical positivism in action. They assume reasoned transitions between phases propelled by repeatable methods. They thus incorporate both of Quine's "two dogmas of empiricism." One of two of Quine's effects of abandoning them was "a shift toward pragmatism."

Creative Design Practice Is Lean and Pragmatic

Melles (2008) considered pragmatism to be "design's natural epistemological base," a position that is very common in design research (Schön was a pragmatist), but not to the point of a suffocating orthodoxy. Pragmatism is a broad church, with most agreement focused on a rejection of logical positivism. Truth tends to be replaced with utility (effectiveness trumps truth) and be understood wholly within the contexts of specific enquiries. No concept is taken for granted. There are no foundations from which truths proceed. There is no best view of the world (but actions, relationships, and functions are more important than true meanings). However, whereas Logical Positivists must insist on the truth of logical positivism, Pragmatists can be pragmatic about pragmatism. Pragmatism is as open to effective philosophical critique as logical positivism, but can accept and embrace issues and concerns without risking some whole enterprise of Absolute Truth.

Design is not averse to scientific truths, but they are only one form of reference memoranda. The aim of design is to deliver something worthwhile, that is, with a favorable balance of benefits over risks and costs. Scientific truths only matter to the extent that they can have a demonstrable bearing on the resulting worth of a design. Being true is not enough. Bearing fruit takes priority.

Design connects artefacts with memoranda that indicate that design options are desirable. Design is a holistic integrator of relevant options and considerations that *remerges memoranti*, things that *have been* borne in mind, not simply those that could be. A single original vision of project inception may diverge into specialist work arenas, but it is remerged by reasoning on rightness of design.

Co-evolution requires reflective conversations involving work products (Schön's "backtalk"). Connections are not restricted to adjacent phases, which in turn are not disciplinary monopolies. Thus, while empirical user research can identify needs, wants, and pain points to inform design purpose, so can other non-empirical considerations from business strategy and creative vision. Indeed, only the latter can be generous and provide unexpected worth.

Co-evolution, backtalk, and generosity are core empirical realities of creative design practice (Cockton, 2014). They require the Scrum of true concurrent design and are stifled by the relays of linear design. They avoid rigid sequences, for example, in ISO 9241-210 contextual research must precede requirements, which must precede design. Such fixed orders inevitably create waste, which lean approaches set out to avoid. Ubiquitous lacks of implications for design from user research is one form of waste, regardless of rigor. The same amount of money spent on shaky research is no worse than rigorous research if both lack implications for design. Better research has better implications for design, not better rigor. This evidences a pragmatist

position that what matters is impact on quality of a design enquiry, not how a hardline academic reviewer would assess research results.

Waste is less likely with design-led conjecture-analysis that follow lean practices such as Lean UX (Gothelf with Seiden, 2013). Assumptions in Lean UX are the conjectures of creative design practice, which are evaluated by minimal viable product (MVP) experiments. An MVP is a low cost *antefact* (not a final artefact; Cockton, 2017). An MVP experiment tests assumptions about users and design purpose, testing not just an antefact in use but carrying out user research to assess the achievement and desirability of product strategy (design purpose as worth, WUD's "future we want"). IDEO founder David Kelley's advice to "fail faster to succeed sooner" reduces waste.

MVP experiments remerge separated memoranda by connecting across a Scrum of antefacts, beneficiaries, purpose, and evaluation. These design arenas do not run a relay, but instead move design work forward together. Over the course of a project, design arenas must be kept in balance, in the sense of audio mixing, not physical weights. More resources can and should be given to some arenas (especially antefact and artefact development) than others (i.e., design purpose, where the key factor is generosity, not effort). Good creative design is thus balanced, integrated (connected), and generous, or BIG for short (Cockton, 2017).

Summary: Team Players Must Play the Same Game

Actions speak louder than words: UX divergence into interaction and service design shows that creative design must be a good thing. However, it must also be a real thing, not a sanitized "safe for work" substitute from Design Thinking or Agile development. Creative design is mostly not scientific. Attempts to impose rational systematic processes and rigorous scientific practices have constantly failed and will fail more and more as more and more creative designers are recruited for their critical expertise for 21st century technological innovation. Creative designers are now at the heart of the technology industry. They won't go away and they can't be side-lined or marginalized. They need to be understood on their own terms and valued for the millennia of achievements that cram every museum and gallery.

Successful design teams work together. Pragmatism allows this. Positivism prevents it. Design cannot be run by any disciplinary agenda that prefers abstract inconsequential rigor to concrete productive experiment. The continued divergence of UX should not be a priority. Instead, UX specialists need to remerge into creative practice. Multi-learning is essential for human scientists to work with creative designers and engineers (and vice-versa, so that project teams can be trusted to productively self-organize overlapping development phases). Subtle management control is required to keep design work balanced and integrated. Continuous reflection and project retrospection can support organizational transfer of learning and tolerance of the instability that is unavoidable in truly creative work.

The UX tail will never wag the Creative Design dog, but harnessed together, UX, design, and other dogs will move faster than any relay team. UX work is essential to good balance in design, but this must be able to connect and integrate. A balanced mix means sharing the initiative, letting non UX roles drive generosity if UX work shackles itself with data.

UX work has proven its value again and again, but it is also often associated with waste due to poor integration. This is not always the fault of UX, but it can be. Identity politics do not help. Riding up as the rigorous positivist can be divisive and obstruct design excellence.

UX work does not need to diverge further into design territory that is already productively occupied. It needs to remerge with strategic, creative, critical design practices. UX does not need to up its game—instead it needs to work with other design roles to up a shared game.

References

Barnum, C. (2019). Invited essay: The state of UX research. *Journal of Usability Studies, 15*(1). 1–7.

Cockton, G. (2008). Some experience! Some evolution! In. T. Erickson & D. W. McDonald (Eds.), *HCI remixed: Reflections on works that have influenced the HCI community* (pp. 215–219). MIT Press.

Cockton, G. (2014). A critical, creative UX community: CLUF. *Journal of Usability Studies, 10*(1), 1–16.

Cockton, G. (2016). Integrating both user-centred design and creative practices into agile development. In G. Cockton, M. L. Lárusdóttir, P. Gregory, & Å. Cajander (Eds.), *Integrating user-centered design in agile development* (pp. 1–46). Springer, Cham.

Cockton, G. (2017). New process, new vocabulary: Axiofact = a_tefact + memoranda. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems* (pp. 747–757). ACM.

Dourish, P. (2006). Implications for design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 541–550). ACM.

Dym, C. L., Little, P., & Orwin, E. J. (2014). *Engineering design: A project-based introduction, 4th ed*. Wiley.

Field, D. (2017). *6 major tech companies have doubled their design hiring goals in last half decade*. Techcrunch. Retrieved from https://techcrunch.com/2017/05/31/here-are-some-reasons-behind-techs-design-shortage/

Goldschmidt, G. (2014). *Linkography: Unfolding the design process*. MIT Press.

Gothelf, J. with Seiden, J. (2013). *Lean UX: Applying lean principles to improve user experience*. O'Reilly Media.

Gribbons, B. (2017). Is it time to drop the "U" (from UX)? *Journal of Usability Studies, 13*(1), 1–4

Hillier, B., Musgrove, J., & O'Sullivan, P. (1972). Knowledge and design. In W. J. Mitchell (Ed.), *Environmental design: Research and Practice* (edra3/ar8 conference, UCLA, 29-3-1 to 293-14.

International. Organization for Standardization. (2019). Ergonomics of human-system interaction— Part 210: Human-centred design for interactive systems. (ISO Standard NO. 9241-210:2019). Retrieved from https://www.iso.org/standard/77520.html

Kolko, J. (2018). The divisiveness of design thinking. *Interactions 25*(3), 28–34.

Law, E. L.-C. (2006). Evaluating the downstream utility of user tests and examining the developer effect: A case study. *International Journal of Human-Computer Interaction, 21*(2), 147–172.

Melles, G. (2008). An enlarged pragmatist inquiry paradigm for methodological pluralism in academic design research. *Artifact: Journal of Design Practice, 2*, 3–11.

Parnas, D. L., & Clements, P. C. (1986). A rational design process: How and why to fake it. *IEEE Transactions Software Engineering, 12*(2), 251–257.

Pinker, S. (2018). Enlightenment now: The case for reason, science, humanism, and progress. Allen Lane.

Pires de Oliveira, A. A. (2017). Nicomachean Ethics VI.9: Good deliberation and phronesis *Princípios: Revista de Filosofia*, *24*(44), 9–41. doi: 10.21680/1983-2109.2017v24n44ID11737.

Popper, K. (1959). *The logic of scientific discovery* (*Logik der Forschung*, first published 1935). Hutchinson & Co.

Quine, W. V. (1951). Two dogmas of empiricism. *The Philosophical Review, 60*(1), 20–43.

Rittel, H. W. J., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences, 4*, 155–169.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.

Takeuchi, H., & Nonaka, I. (1986). The new product development game. *Harvard Business Review, 64*(1), 137–146.

Tractinsky, N., Katz, A. S., & Ikar, D. (2000). What is beautiful is usable. *Interacting with Computers, 13*(2), 127–145.

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